SESSION SUMMARY

Reproduction in Reef Fishes

by

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The three talks, by Smith, Ross, and Colin, well illustrated the most important approaches to studying reproduction of reef fishes. The first approach, illustrated to a great extent by Smith's work, deals with reproduction patterns as evolutionary strategies and discusses how different reproductive schemes (viewed as both physiological and behavioural processes) provide solutions to various problems of maintenance of fish populations posed by the reef environment. This paper further examined the impact of an exogenous force, fishing, on the success of some reproductive schemes. The second approach, best illustrated by Colin's talk, is the detailed in situ observation and subsequent description, of reef fish reproductive behavior. Important in this approach are attempts to correlate the observed behavior with environmental factors. The results of such correlations provide the basis for the development of hypotheses about the function of the observed behavior. The third approach, described by Ross, is the detailed histological examination of gonads to provide estimates of age of maturity, time and frequency of spawning, fecundity, and in hermaphroditic species, the age and rate of change of sex. Attempts to correlate the observed phenomena with environmental factors are a critical facet of the research. The results of investigations of this third type provide the basis for hypothesis formation and are necessary to accomplishment of the first, theoretical, approach to studying reproduction in fishes.

The question posed to the Southeast Fisheries Center is what kind of research on reproduction should it be doing? Should all three approaches be followed with equal emphasis or should some assymetrical mixture be sought.

That the workshop discussions did not result in a clearcut answer to the question suggests that fairly strong arguments can be made for each of the research directions and that the best program will contain research of all three approaches. However, logic suggests that observational research on behavior and on gonadal processes must precede the more esoteric and theoretical research programs. In a nascent program, as is that of the SEFC, observational research should probably be of first priority after determining concretely how reproductive patterns can significantly affect advice required for management of fisheries for reef fish.

Several specific problems relating to reproduction were described during the discussions that deserve special mention here. Most important is our lack of understanding of grouper spawning in general and of grouper spawning aggregations in particular. We have little solid knowledge about the location, frequency, and regularity of these groupings, about their occurrence in many species, about the proportion of a stock participating in these, about their relationship to pair spawning in groupers, nor about the impact on the stock as a whole of fishing these aggregations. The research required to answer these questions ranges from simple to very complex and deserves far more attention than it has been getting. It was suggested that the most promising approach for initial investigation of the aggregation problems would be to study Nassau grouper stocks on the Puerto Rican shelf.

Another valuable discussion concerned the apparent timing of spawning in some species to coincide with certain lunar (and thus tidal) phases, presumably so that return of progeny to the parents' reef is enhanced. Similarly, some observers have hypothesized that many species spawn on the upcurrent end of islands so that progeny have the maximum probability of remaining near the parents' reef. Workshop participants pointed out important exceptions to the lunar and geographic hypotheses suggesting, as is usual in nature, that many schemes are in place and that some species are inconsistent in where, when and how they spawn.

A useful conclusion to this discussion would be to rank the importance of reproduction research against other types of reef fish research. Unfortunately that seems nearly impossible. Proper management of reef fisheries requires full understanding of the fishes and their relationship to their environment; that is management requires completing the whole puzzle. Here, as with most puzzles, all the pieces are important.